

PEER REVIEW HISTORY

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ARTICLE DETAILS

TITLE (PROVISIONAL)	Sleep hygiene strategies for individuals with chronic pain: A scoping review
AUTHORS	Gupta, Charlotte; Sprajcer, Madeline; Johnston-Devin, Colleen; Ferguson, Sally

VERSION 1 – REVIEW

REVIEWER	Soeun Lee University of Guelph, Psychology
REVIEW RETURNED	21-Feb-2022

GENERAL COMMENTS	<p>Thank you for the opportunity to review the manuscript “Are current sleep hygiene strategies effective for individuals with chronic pain? A scoping review”. This paper describes the current literature base on sleep hygiene practices/interventions within individuals living with chronic pain. The paper is focused on an important research question regarding the current evidence on sleep hygiene in the context of chronic pain and is overall well written.</p> <p>The major concern is that the study method is not appropriate for the research question/objectives. The authors are encouraged to consult recently published papers and guidelines regarding the appropriateness of a scoping vs. systematic review. As the authors state, a scoping review is recommended when the research literature is broad and heterogenous. However, the main purpose of a scoping review is to map the current literature base, and identify research gaps and recommendations for further inquiry. Thus, a scoping review is not appropriate for answering this manuscript's stated research question about the effectiveness/efficacy of sleep hygiene practices (to answer this question, a systematic review and meta-analysis would be appropriate). The authors need to be specific and clear in their justification of their study method for their research question, or consider other more appropriate methods. If there is a scoping review protocol that was developed a priori, the authors are strongly encouraged to register and/or reference the protocol in the paper.</p> <p>Other concerns:</p> <ul style="list-style-type: none">- There is no information or data reported on the characteristics of the included studies. Information on age ranges (and means, SD) of participants, gender/sex, and race/ethnicity, etc. is necessary to interpret the study findings/mapping of the literature.- Please include a column in Table 4 of age ranges, mean, and SD of participants in each study. The authors are encouraged to consider whether it may be important to acknowledge the wide age range of included participants, particularly when considering developmental changes and normative fluctuations in sleep across
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	<p>the lifespan.</p> <ul style="list-style-type: none"> - Please include a separate column of sleep outcome assessed. This is sometimes reported in the population/study settings and sometimes in the findings column. - There is a need to temper language throughout the paper, particularly in the abstract and discussion. For example, in paragraph two of the discussion – firm conclusions cannot be drawn on the effectiveness of pre-bed state on the basis of 11 studies and the scoping review methodology. - Please state the most recent date(s) the search was conducted. - In the abstract: please state specific objectives in the objectives section.
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REVIEWER	Eivind Skarpsno Norwegian University of Science and Technology, Department of Public Health and Nursing
REVIEW RETURNED	01-Apr-2022

GENERAL COMMENTS	<p>Overall comment: Thanks for the opportunity to review this paper. Please find some comments below:</p> <p>As far as I understand, the overall aim of this study is to investigate if current sleep hygiene strategies are effective for individuals living with chronic pain, i.e., how effective each strategy is for improving sleep. It is unclear why the authors have included both cross-sectional and prospective studies including participants without chronic pain (e.g., adolescents undergoing chemotherapy, audio visual stimulation, etc). Can these studies answer the research question? For instance, in Table 4, in the column “Findings”, many studies do not report sleep related outcomes.</p> <p>The authors use the word “intervention” throughout the manuscript. Is this okay considering that many studies are observational (cross-sectional/prospective) - without an actual intervention? How can cross-sectional studies be used to conclude anything about the effect of sleep hygiene strategies on sleep outcomes in people with chronic pain?</p> <p>Some minor comments:</p> <ol style="list-style-type: none"> 1) The first part of the abstract is quite long. The authors may consider to be more precise and shorten the first part (“Objectives”). I think the paper would benefit from an even clearer objective in the Abstract. 2) The second bullet point: How can a scoping review be a strength, especially since the authors did not conduct a full systematic search? 3) Introduction: To improve the readability of the paper, the authors could consider revising the second and third paragraph. These paragraphs are somewhat repetitive. 4) Discussion: The discussion is somewhat superficial and would benefit from a more thorough description of: the sleep hygiene advice, clinical implications, and limitations of the included studies. For instance, “Together, these studies suggest that while sleep hygiene strategies may be used by people living with chronic pain^{77,78}, there is limited evidence to support the effectiveness of some strategies.” Please elaborate on “some strategies”. Regarding physical activity, there is great heterogeneity between the included studies (cross-sectional, prospective, randomized). How could this have influenced the conclusion?
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VERSION 1 – AUTHOR RESPONSE

Reviewer: 1

Ms. Soeun Lee, University of Guelph

Comments to the Author:

Thank you for the opportunity to review the manuscript “Are current sleep hygiene strategies effective for individuals with chronic pain? A scoping review”. This paper describes the current literature base on sleep hygiene practices/interventions within individuals living with chronic pain. The paper is focused on an important research question regarding the current evidence on sleep hygiene in the context of chronic pain and is overall well written.

Thankyou for this positive feedback.

The major concern is that the study method is not appropriate for the research question/objectives. The authors are encouraged to consult recently published papers and guidelines regarding the appropriateness of a scoping vs. systematic review. As the authors state, a scoping review is recommended when the research literature is broad and heterogenous. However, the main purpose of a scoping review is to map the current literature base, and identify research gaps and recommendations for further inquiry. Thus, a scoping review is not appropriate for answering this manuscript's stated research question about the effectiveness/efficacy of sleep hygiene practices (to answer this question, a systematic review and meta-analysis would be appropriate). The authors need to be specific and clear in their justification of their study method for their research question, or consider other more appropriate methods. If there is a scoping review protocol that was developed a priori, the authors are strongly encouraged to register and/or reference the protocol in the paper.

Thankyou for raising this important point. Our goal in writing this review was to explore the literature on chronic pain and sleep hygiene strategies with the goal of understanding the scope of the work previously done to determine if there are gaps in the literature that need to be addressed before we can understand the effectiveness of a sleep hygiene approach. Therefore, a scoping review methodology was the most appropriate. We agree that the wording of the research question did not reflect our plan for this review and our research aim, and the use of the word 'effectiveness' implied a systematic approach to the review. While we believe a systematic review on this topic is important, it is the next step in this field after a scoping review of the state of the field. We have updated the research aim to reflect the scoping review methodology and our original research goal. Language has also been amended throughout the manuscript to reflect this update.

Updated research aim (added to abstract and introduction):

The aim of this scoping review is to map the state of the existing literature examining sleep hygiene strategies in individuals with chronic pain.

Other concerns:

- There is no information or data reported on the characteristics of the included studies. Information on age ranges (and means, SD) of participants, gender/sex, and race/ethnicity, etc. is necessary to interpret the study findings/mapping of the literature.

Information on the participants in addition to greater detail on the sleep measures and protocol of the studies has been added to the supplemental table to assist with the interpretation of study findings. Information on the characteristics of the reported studies has been included in the results and the discussion.

Chronic pain populations included individuals with fibromyalgia (n = 3), non-specified chronic pain (n = 6), non-cancer related chronic pain of any kind (n = 4), chronic spinal pain (n = 1), chronic benign neck, low back and/or generalised pain (n = 2), chronic low back pain (n = 2), musculoskeletal chronic pain (n = 3), back pain, osteoarthritis, and/or rheumatoid arthritis (n = 1), Failed Back Surgery Syndrome (n = 1), chronic knee pain (n = 1), sickle cell disease (n = 1), orofacial pain (n = 1), chronic rheumatic conditions (n = 2), cancer (n = 1), and Parkinson's disease (n = 1). Participants in the included studies included adults (n = 29) with one study including child participants (n = 1).

The included studies for pre-bed state as a sleep hygiene strategy included participants from a wide range of age groups. This is an important consideration when interpreting the impact of this sleep hygiene strategy, as there are age-related changes in sleep across the lifespan⁸⁰, which may mean that the sleep of different age groups with chronic pain are differentially impacted by sleep hygiene strategies.

- Please include a column in Table 4 of age ranges, mean, and SD of participants in each study. The authors are encouraged to consider whether it may be important to acknowledge the wide age range of included participants, particularly when considering developmental changes and normative fluctuations in sleep across the lifespan.

A column for participant age has been included in the supplemental table. Thank you for the suggestion to discuss the wide age range of participants and age-related changes in sleep, we have included this in the discussion section.

The included studies for pre-bed state as a sleep hygiene strategy included participants from a wide range of age groups. This is an important consideration when interpreting the impact of this sleep hygiene strategy, as there are age-related changes in sleep across the lifespan⁸⁰, which may mean that the sleep of different age groups with chronic pain are differentially impacted by sleep hygiene strategies.

- Please include a separate column of sleep outcome assessed. This is sometimes reported in the population/study settings and sometimes in the findings column.

We have added a column to the Supplementary table for sleep outcome assessed.

- There is a need to temper language throughout the paper, particularly in the abstract and discussion. For example, in paragraph two of the discussion – firm conclusions cannot be drawn on the effectiveness of pre-bed state on the basis of 11 studies and the scoping review methodology.

Thankyou for this suggestion, the language has been updated throughout to reflect the updated study aim and to reframe the conclusions that have been drawn. Paragraph two of the discussion now reads as follows:

Studies were found that supported the use of six specific sleep hygiene strategies (education, exercise, limiting alcohol use, limiting tobacco use, pre-bed state, and sleep environment), the most promising of which appear to be management of pre-bed state and use of daytime exercise. Standard sleep hygiene advice relating to pre-bed state highlights the need to avoid thinking, planning and worrying before sleep³². The 11 identified studies that addressed pre-bed state suggest that using strategies such as relaxation^{49 51}, mindfulness^{48 53}, and meditation and music⁵⁴ can improve sleep quality and decrease sleep disturbance in people with chronic pain. However, it must be noted that many of the included studies did not require these relaxation strategies to be performed

immediately prior to bed (i.e., these activities were performed at any time of day). It is possible that the impact of these activities on pre-bed state (and potentially on subsequent sleep) would be greater if performed within the context of a specific sleep hygiene intervention (i.e., if relaxation or mindfulness activities were performed in the hour or two before bed). The included studies for pre-bed state as a sleep hygiene strategy included participants from a wide range of age groups. This is an important consideration when interpreting the impact of this sleep hygiene strategy, as there are age-related changes in sleep across the lifespan 80, which may mean that the sleep of different age groups with chronic pain are differentially impacted by sleep hygiene strategies. Further, given that chronic pain is typically associated with high levels of stress and anxiety 81, it is likely that interventions designed to improve pre-bed state may be of particular importance for improving sleep in this population 82.

- Please state the most recent date(s) the search was conducted.

The most recent date the search was conducted was 22/4/21. This has been added to the methods section.

A search was performed using the databases Medline, Embase, PSYCInfo, and Cumulative Index to Nursing and Allied Health Literature (CINAHL). The search was conducted on 22nd April 2021. Searches...

- In the abstract: please state specific objectives in the objectives section.

The objectives have been included in the abstract.

This scoping review aims to map the state of the existing literature examining sleep hygiene strategies in individuals with chronic pain.

Reviewer: 2

Dr. Eivind Skarpsno, Norwegian University of Science and Technology

Comments to the Author:

Overall comment: Thanks for the opportunity to review this paper. Please find some comments below:

As far as I understand, the overall aim of this study is to investigate if current sleep hygiene strategies are effective for individuals living with chronic pain, i.e., how effective each strategy is for improving sleep. It is unclear why the authors have included both cross-sectional and prospective studies including participants without chronic pain (e.g., adolescents undergoing chemotherapy, audio visual stimulation, etc). Can these studies answer the research question? For instance, in Table 4, in the column "Findings", many studies do not report sleep related outcomes.

Thankyou for this comment. As the aim of this scoping review was to understand the state of the current literature on sleep hygiene in individuals with chronic pain, we included any study sample that discussed an experience of chronic pain in the methodology. As suggested by the reviewer, there are likely differences between populations on the level of chronic pain experienced by these samples during data collection. This does still answer our research aim of understanding the state of the current literature on this topic and is an important limitation of the literature to consider. This has been included in the discussion section.

The differences between chronic pain conditions must also be considered, in addition to individuals experiencing chronic pain as a symptom of a treatment (e.g. chronic pain associated with chemotherapy 71).

There are several different sleep outcomes included in the "Findings" column of the Supplementary Table, including sleep quality, sleep problems, and insomnia severity. While these are distinct facets of sleep health, we did not have an inclusion criterion on the specific sleep outcome measure for included studies due to the scoping nature of the review. It was important to understand which measures have been used in individuals with chronic pain to identify research gaps.

The authors use the word "intervention" throughout the manuscript. Is this okay considering that many studies are observational (cross-sectional/prospective) - without an actual intervention? How can cross-sectional studies be used to conclude anything about the effect of sleep hygiene strategies on sleep outcomes in people with chronic pain?

Thank you for raising this point, we have used the term 'intervention' for consistency with the PICO structure used to develop the inclusion criteria for the review. To keep this consistency we have left in the use of intervention throughout the manuscript when referring to the sleep hygiene strategies used in the studies, and we have included clarification of this in the methods section:

Articles were required to include at least one sleep hygiene strategy (for the purposes of this review, any sleep hygiene strategy used in an included study is termed a sleep hygiene intervention)

Some minor comments:

1) The first part of the abstract is quite long. The authors may consider to be more precise and shorten the first part ("Objectives"). I think the paper would benefit from an even clearer objective in the Abstract.

We have shortened the objectives section and included a clear research aim in the abstract. The objectives section now reads:

Up to a quarter of the world's population experience chronic pain, which, in addition to interfering with daily activities and waking function, is often associated with poor sleep. Individuals experiencing poor sleep are often encouraged to implement sleep hygiene strategies. However, current sleep hygiene strategies have not been developed considering the unique challenges faced by individuals with chronic pain and therefore they might not be as effective in this population. The aim of this scoping review is to map the state of the existing literature examining sleep hygiene strategies in individuals with chronic pain.

2) The second bullet point: How can a scoping review be a strength, especially since the authors did not conduct a full systematic search?

The reviewers raise a good point and we have updated the strengths and limitations section of the manuscript.

Strengths and limitations of this study

- This is the first scoping review to explore of sleep hygiene strategies in chronic pain populations
- A strength of this scoping review was the comprehensive search strategy and broad inclusion criteria.

- As this was a systematic review, studies of lower quality may be included.
- The terminology used to discuss sleep hygiene varied greatly amongst the included studies which may have resulted in studies missed.

3) Introduction: To improve the readability of the paper, the authors could consider revising the second and third paragraph. These paragraphs are somewhat repetitive.

Thankyou for this suggestion, we have revised the second and third paragraph as follows:

The relationship between poor sleep and chronic pain is well documented 5-7 and bi-directional 8 9. Individuals with chronic pain generally report poorer sleep quality 10 11 and quantity 10-12 compared to those without chronic pain. This is problematic, as sleep is a biological need, with 7-9 hours of sleep per night recommended for adults for optimal health and wellbeing 13 14. Poor sleep is associated with poorer physical and psychological health outcomes 15 16, in addition to impaired cognition, memory, attention, and alertness 5 17 18. Conversely, adequate night-time sleep appears to be predictive of less pain and may assist individuals to cope with chronic pain 5 7. Thus, there are likely to be far reaching benefits of improving sleep in individuals experiencing chronic pain.

There is a need for strategies to improve sleep to be incorporated into current treatment and management approaches for chronic pain. While there are various strategies to manage chronic pain 20, historically, medication is the most common treatment for pain symptoms 21-23. However, some pain medications can impact sleep 24-26 and people with chronic pain have a higher risk of substance abuse 27. Evidence is growing to support a multidisciplinary approach to pain management using a biopsychosocial framework 27. Consequently, other strategies are being utilised to manage sleep and pain, including behavioural, non-pharmacological strategies 27 28. One such behavioural strategy is sleep hygiene.

4) Discussion: The discussion is somewhat superficial and would benefit from a more thorough description of: the sleep hygiene advice, clinical implications, and limitations of the included studies. For instance, "Together, these studies suggest that while sleep hygiene strategies may be used by people living with chronic pain^{77,78}, there is limited evidence to support the effectiveness of some strategies." Please elaborate on "some strategies".

We have revised the discussion to include greater description of the implications of the findings of the scoping review. The sentence in the beginning of the discussion has also been updated, see below:

The aim of this scoping review was to map the state of the existing literature examining sleep hygiene strategies in individuals with chronic pain. While there was a range of literature supporting the use of sleep hygiene strategies in individuals with chronic pain, the heterogeneity of sleep hygiene strategies used, and chronic pain samples studied limits the generalisability of current findings. This finding is important to consider given that sleep hygiene strategies are commonly recommended for those with chronic pain as part of behavioural treatments ⁷⁹.

Regarding physical activity, there is great heterogeneity between the included studies (cross-sectional, prospective, randomized). How could this have influenced the conclusion?

As the reviewer states, there is great heterogeneity between the included studies for the exercise strategy. We have included discussion of this in the discussion section.

Conflicting results were found for exercise as a sleep hygiene strategy in people with chronic pain. Given that there was a high level of heterogeneity in the types and duration of exercise measured in

each study, no one study can provide recommendations for the optimal type or duration of exercise for improving sleep in individuals with chronic pain. It is also likely that the effectiveness of exercise as a strategy for improving sleep differs based on the type of chronic pain experienced by the individual, as well as the type of exercise (e.g. high intensity vs low intensity).

VERSION 2 – REVIEW

REVIEWER	Soeun Lee University of Guelph, Psychology
REVIEW RETURNED	05-Sep-2022

GENERAL COMMENTS	<p>Thank you for the opportunity to re-review this manuscript. It is evident that the authors have taken reviewer comments into consideration and the edits are very appreciated and I believe have strengthened the connection between the aims, methods, results, and discussion of the scoping review. Some concerns remain regarding increasing clarity within the scoping review to aid the interpretation of the results, as well as further clarity regarding the aims of the scoping review (which is sometimes inconsistent within the abstract and main paper). Specific areas for further revision are noted below:</p> <p>MAJOR COMMENTS:</p> <ul style="list-style-type: none"> - Concerns remain regarding clarity about why a scoping review methodology was specifically chosen, and how this is aligned with stated aims. The authors have made some edits, but still refer to the “effectiveness” of sleep hygiene strategies being unknown in this population, which is somewhat misleading (e.g., abstract, “Design” section; abstract, “conclusion”, second half of first sentence; page 4, line 55; page 5, line 48). Further re-wording is needed here in order to be consistent with the broader, stated aim of mapping the literature (e.g., is it to first understand which sleep hygiene strategies have been used, in which populations, etc?). It makes sense that this would be a logical first step before conducting a systematic review, as the authors helpfully stated in their response, but this is not clearly stated in the manuscript. Consulting the Joanna Briggs Institute Manual on the Methodology for JBI Scoping Reviews (2015) may be helpful to aid in these edits. - An area of confusion is the sleep hygiene terms that are used throughout the manuscript. For example, sleep hygiene is defined as “healthy sleep practices”, but in Table 2, some terms are associated with what we would consider “poor sleep hygiene” (e.g., alcohol, tobacco, caffeine, pre-bed alerting activities, pre-bed state, etc.). In Table 1, it is clear that the avoidance of these are indicative of a sleep hygiene strategy, but this becomes somewhat confusing later on in the manuscript. It may be helpful to have a footnote in Table 2 to indicate which terms are related to poorer sleep hygiene. Edits to the “tobacco” and “alcohol” headers may be helpful in the results as it currently seems that these are “helpful” sleep hygiene strategies. Perhaps subsections in the results to delineate “helpful” vs “unhelpful” strategies may be one consideration. <p>MINOR COMMENTS:</p> <p>Abstract:</p> <ul style="list-style-type: none"> - Suggest tempering language in the results section that states “with evidence found to support...”; perhaps “reporting on six sleep hygiene strategies...” or the like. <p>Introduction:</p>
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	<p>- On p.3 of the manuscript, bullet point 3 states “as this is a systematic review...” I believe this should state “scoping review”. However, further to this point, I believe that the authors’ statement that studies of lower quality may have been included is not valid, because that is not the purpose of a scoping review in the first place (to make statements about quality of studies). Rather, a limitation may be that while this provides a helpful and informative map and summary of the literature, further research and meta-analyses will be needed to speak to the effectiveness/quality of studies in this research area.</p> <p>Methods:</p> <ul style="list-style-type: none"> - Table 3, under “Population”, suggest adding “chronic pain population of any kind and age” - Information identifying who conducted various parts of the review would enhance clarity of methods (e.g., who did the searches, hand searched reference lists, extracted data). The authors provide information on who conducted full text screening on page 9, and similar information for other aspects of the methods would be helpful. <p>Results:</p> <ul style="list-style-type: none"> - I quite like the table that is a part of Supplementary File 1, and could see myself referring to this table as both a researcher and clinician. If manuscript page limits would allow, I would highly recommend that this table be moved to be within the main manuscript - Page 10, line 17 under “synthesis of results”; suggest rewording to “listed based on most commonly reported in the literature to least commonly reported”, to avoid language about “evidence” - Page 12, line 50, suggest heading to be “Sleep Education” rather than education broadly for clarity. - Consider removing or editing first paragraph of “pre-bed state” section, as this does not seem to be speaking to a sleep hygiene strategy but rather a deleterious correlate of poorer sleep. <p>Discussion:</p> <ul style="list-style-type: none"> - Page 13, line 52, suggest rewording to “X number of studies were found that reported on the use of six sleep hygiene strategies” - Page 13, line 56, temper language about “promising” strategies - Page 17. Lines 13-18; similar to my previous comments, a scoping review does not aim nor is able to assess risk of bias in studies, so this in itself is not a limitation of the method.
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VERSION 2 – AUTHOR RESPONSE

Reviewer: 1

Ms. Soeun Lee, University of Guelph

Comments to the Author:

Thank you for the opportunity to re-review this manuscript. It is evident that the authors have taken reviewer comments into consideration and the edits are very appreciated and I believe have strengthened the connection between the aims, methods, results, and discussion of the scoping review. Some concerns remain regarding increasing clarity within the scoping review to aid the interpretation of the results, as well as further clarity regarding the aims of the scoping review (which is sometimes inconsistent within the abstract and main paper). Specific areas for further revision are noted below:

Thankyou for your positive feedback on the manuscript

MAJOR COMMENTS:

- Concerns remain regarding clarity about why a scoping review methodology was specifically chosen, and how this is aligned with stated aims. The authors have made some edits, but still refer to the “effectiveness” of sleep hygiene strategies being unknown in this population, which is somewhat misleading (e.g., abstract, “Design” section; abstract, “conclusion”, second half of first sentence; page 4, line 55; page 5, line 48). Further re-wording is needed here in order to be consistent with the broader, stated aim of mapping the literature (e.g., is it to first understand which sleep hygiene strategies have been used, in which populations, etc?). It makes sense that this would be a logical first step before conducting a systematic review, as the authors helpfully stated in their response, but this is not clearly stated in the manuscript. Consulting the Joanna Briggs Institute Manual on the Methodology for JBI Scoping Reviews (2015) may be helpful to aid in these edits.

Thankyou for this suggestion and for recommending the JBI manual. The reviewer is correct in that the aim of the review is to map the state of the existing literature examining sleep hygiene strategies as the first step in the pathway to assessing the effectiveness of these strategies in this population. We have updated the suggested sections and also reviewed and edited other sections to match this scoping review aim. Additionally we have updated the title of this manuscript to match the research aim of the scoping review.

Abstract: conclusion

This scoping review examined the existing literature focussing on sleep hygiene strategies for people with chronic pain. There are limitations to the methodology of the existing literature and gaps in our understanding of sleep hygiene strategies in some chronic pain conditions that must be addressed in future research before the effectiveness of these strategies can be understood.

Introduction:

However, there are limitations to our understanding of the scope of current sleep hygiene strategies

- An area of confusion is the sleep hygiene terms that are used throughout the manuscript. For example, sleep hygiene is defined as “healthy sleep practices”, but in Table 2, some terms are associated with what we would consider “poor sleep hygiene” (e.g., alcohol, tobacco, caffeine, pre-bed alerting activities, pre-bed state, etc.). In Table 1, it is clear that the avoidance of these are indicative of a sleep hygiene strategy, but this becomes somewhat confusing later on in the manuscript. It may be helpful to have a footnote in Table 2 to indicate which terms are related to poorer sleep hygiene. Edits to the “tobacco” and “alcohol” headers may be helpful in the results as it currently seems that these are “helpful” sleep hygiene strategies. Perhaps subsections in the results to delineate “helpful” vs “unhelpful” strategies may be one consideration.

Thankyou for this point to add clarity to the discussion of sleep hygiene strategies. We have updated Table 2 to include the sleep hygiene strategies and show how the keywords and search terms were formed from the original strategies. Additionally, we have added the specific wording of the sleep hygiene strategies to the sub-sections of the results to provide context, as reviewer 1 suggests, on whether the strategies are helpful or unhelpful.

MINOR COMMENTS:

Abstract:

- Suggest tempering language in the results section that states “with evidence found to support...”; perhaps “reporting on six sleep hygiene strategies...” or the like.

This language has been tempered in the results section of the abstract, see below:

Thirty articles investigated at least one sleep hygiene strategy in individuals with chronic pain, with improvements to sleep reported for six sleep hygiene strategies

Introduction:

- On p.3 of the manuscript, bullet point 3 states “as this is a systematic review...” I believe this should state “scoping review”. However, further to this point, I believe that the authors’ statement that studies of lower quality may have been included is not valid, because that is not the purpose of a scoping review in the first place (to make statements about quality of studies). Rather, a limitation may be that while this provides a helpful and informative map and summary of the literature, further research and meta-analyses will be needed to speak to the effectiveness/quality of studies in this research area.

Thankyou for the wording suggestions for this section, we have included this wording in two of the bullet points for consistency with the manuscript.

- A strength of this scoping review was the comprehensive search strategy and broad inclusion criteria that allowed for an understanding of the current literature.
- As this was a scoping review, to assess the effectiveness of sleep hygiene in chronic pain populations and the quality of the current literature, systematic reviews and meta-analyses are needed as a next step.

Methods:

- Table 3, under “Population”, suggest adding “chronic pain population of any kind and age”

Thankyou for this suggestion to match this section with our search findings, this wording has been updated in Table 3

Table 3. *Cochrane PICO strategy*

Population	Intervention	Comparison	Outcome
Chronic pain population of any kind and age	Sleep hygiene intervention (refer to Table 1)	No comparison required. Typically, a control group where no	A minimum of one sleep outcome (subjective and/or objective measures)

intervention is used.

- Information identifying who conducted various parts of the review would enhance clarity of methods (e.g., who did the searches, hand searched reference lists, extracted data). The authors provide information on who conducted full text screening on page 9, and similar information for other aspects of the methods would be helpful.

We have included information about the steps of the review to enhance clarity, thank you for this suggestion.

Search terms section:

The search was conducted on 22nd April 2021 by author MS.

Reference lists were also hand-searched by author MS to identify any additional articles that were not included in the initial search. Abstract and full text screening steps were performed by authors MS and SF.

Data charting section:

Data charting was conducted by author MS.

Results:

- I quite like the table that is a part of Supplementary File 1, and could see myself referring to this table as both a researcher and clinician. If manuscript page limits would allow, I would highly recommend that this table be moved to be within the main manuscript

Thank you for this positive feedback on the Table. Due to manuscript requirements regarding tables over two pages, this table has to be published online as supplementary material.

- Page 10, line 17 under “synthesis of results”; suggest rewording to “listed based on most commonly reported in the literature to least commonly reported”, to avoid language about “evidence”

Thank you for the suggested changes to this section, the wording has been updated.

The strategies are listed based on those most commonly reported in the literature to those least commonly reported.

- Page 12, line 50, suggest heading to be “Sleep Education” rather than education broadly for clarity.

This heading has been updated.

- Consider removing or editing first paragraph of “pre-bed state” section, as this does not seem to be speaking to a sleep hygiene strategy but rather a deleterious correlate of poorer sleep.

Thank you for highlighting this, we have reworded this first paragraph to be consistent with the other sections and state how this strategy was associated with sleep outcomes in chronic pain populations.

Both studies demonstrated that heightened pre-bed state, measured by greater pre-sleep arousal, was associated with higher scores on the Insomnia Severity Index, indicating impaired sleep. The study by Zaidel, et al. [57] used a cross-sectional design in older adults (>65 years old) diagnosed with chronic pain and reported that pre-bed state, measured as higher daily stress, was associated with poor sleep quality and quantity.

Discussion:

- Page 13, line 52, suggest rewording to “X number of studies were found that reported on the use of six sleep hygiene strategies”

This has been changed to include the number of studies found.

Thirty studies were found...

- Page 13, line 56, temper language about “promising” strategies

This language has been updated in the discussion section.

...with the most commonly reported strategies being the management of pre-bed state and use of daytime exercise

- Page 17. Lines 13-18; similar to my previous comments, a scoping review does not aim nor is able to assess risk of bias in studies, so this in itself is not a limitation of the method.

This sentence has been removed from the limitations. For consistency with your insights on the strengths and limitations dot points at the start of the manuscript, this point has been included as a future direction in the discussion.

Following additional studies, systematic reviews and meta-analyses should be prioritised to assess effectiveness of the sleep hygiene strategies investigated in the chronic pain populations represented by the literature.

VERSION 3 – REVIEW

REVIEWER	Soeun Lee University of Guelph, Psychology
REVIEW RETURNED	28-Nov-2022
GENERAL COMMENTS	Thank you for thoughtfully addressing the revisions; I enjoyed reading this revised draft of the manuscript. I have no further comments to provide.